

INDUSTRIAL MANAGEMENT RESEARCH CONCERNING THE ACHIEVEMENT OF AN ECO-INNOVATION LIBRARY

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Abstract: *The Europe 2020 Strategy emphasizes the eco-innovation concept, which is a main tool in reducing the pressure on the environment and eliminating the gap between innovation and industrial market. Eco-friendly technologies are good for business, helping to create new jobs, which is essential for their economic competitiveness. Accelerating eco-innovation across all economy sectors represents the target to support SMEs, a leading role being conducted by eco – friendly technologies introduced on industrial market. In this spirit research has been undertaken to achieve a virtual hub for eco-innovation to increase the competitiveness in recycling waste electrical and electronic equipment (EcoInnEWaste). An important component is the eco-innovation library, a useful device for business environment, which allows the user access to relevant information resources concerning recycling and eco – innovation, at national and international level, about: environmental legislation, business environment, WEEE studies, research, guides and news and eco-innovation technologies.*

Key words: *environment, eco-innovation, library, industrial, management.*

1. Introduction

For an intelligent and sustainable growth is necessary to put in practice Europe 2020 strategy, which is based on eco-innovation. The Decision N° 1639/2006/EC establishing a Competitiveness and Innovation Framework Programme define the eco-innovation as “*any innovation that makes progress towards the goal of sustainable development by reducing impacts on the environment, increasing resilience to environmental pressures or using natural resources more efficiently and responsibly*”.

A key role for innovation stimulation process is kept by the Eco ó innovation

Action Plan (Eco AP) that follows the idea to reduce the pressure over environment and to eliminate the gap between innovation and market. The document highlights that the “Eco-innovation and green technologies are key to Europe’s future and at the heart of the European Union’s policies. The EU’s economic prosperity and well being is intrinsically linked to its natural environment, and the global demand for renewable energy and resource-efficient solutions will be a source of jobs and economic growth in the years to come” [1].

European environment policy will be guided by the 7th Environment Action Programme (EAP) until 2020.

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One of the important components of this Plan is represented by the innovative, environmentally friendly technologies that are also beneficial to business, helping to create new jobs, which is essential for Europe's economic competitiveness.

The EcoAP is focused on the eco-innovation concept, by acting in research, industry and policy domains, also using financial instruments. So, the implementation of eco-innovative technologies, at national and international level, represents a good opportunity to sustain the SMEs, to help them improving their investment and introducing eco-friendly technologies on the market and promoting international collaboration in this area, through European Innovation Partnerships.

At European level it was developed the Framework Programme for Competitiveness and Innovation 2007-2013 in order to improve the competitiveness and innovation capacity of companies in the European Community, emphasizing the eco-innovation direction.

The number of SMEs in the European companies has a high share and flexibility, so they receive special attention, being the target of a subprogram focused on entrepreneurship and innovation; this one facilitates the SMEs access to finance for creation and development, being sustained by 430 million euros budget for investment in eco-innovation projects activities, [1].

Studies and reports of European Commission published in *Eco-Innovation Observatory* define a broader area for green sectors and activities, by collecting information on firm-level strategies. So, eco-innovations are most widespread in the manufacturing industries, such as: electricity, gas, steam and air conditioning supply; and water supply, sewerage, waste management and remediation activities, [4].

Also, the publication *Eco-innovation observatory* of the European Commission shows in Annual Report 2012 the ways to follow for Europe in transition. Paving the way to a green economy through eco-innovation.

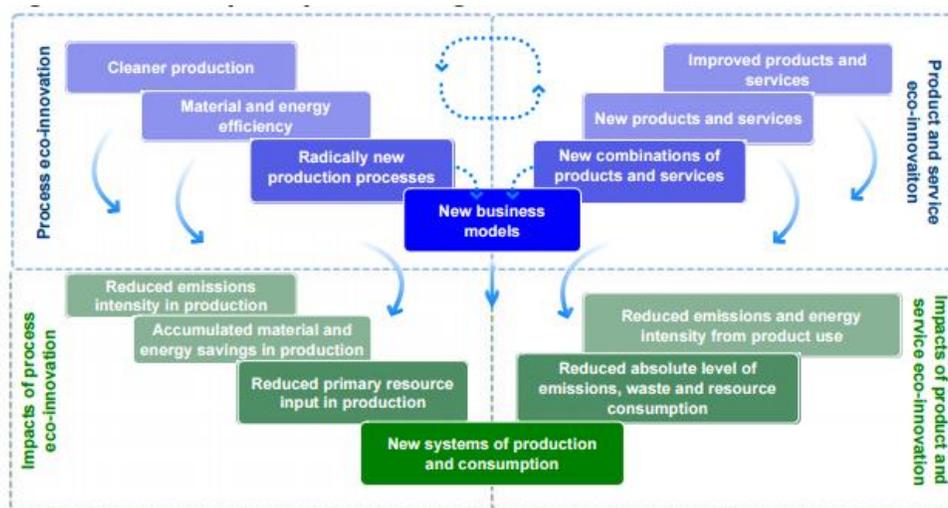


Fig.1. Pathways to systemic change, [4]

The figure 1 *Pathways to systemic change* [4] shows the main idea to improve product, service and process for material and energy efficiency

improvements, doing also more structural shift in the way companies do business, for to foster a resource-efficient Europe, [5]. Figure 1 depicts how different stages of change at the business level, in both how the company operates internally and what they sell, relates to impacts at the macro level, [5].

Different studies for the analysis of resource efficient industry policy show pragmatic approaches that propose five core elements to realize the first paradigm of a resource-efficient and recycling-based industry:

1. Sustainable markets, which provide a direction for innovation;
2. Strong institutions which act as a key to a successful diffusion;
3. Resource efficient products and services;
4. Public procurement using the market power and exemplary function of government as a consumer;
5. Awareness raising Sustainable markets of the future providing a direction for innovation, [6], [7].

These ways underline the importance of developing innovative results obtained from research. They must be oriented towards the development of resource efficient products and services and to introduced them in production and on the market, improving resource efficiency.

Also dissemination and diffusion in the EU of eco-innovative results must be supported by instruments such as trade fairs, market information, technology platforms and innovation partnerships. It is the key role of Framework Program Horizon 2020 and technology and innovation platforms to support resource efficient solutions and their diffusion.

In Romania, COSME Program intends to boost enterprises and SMEs competitiveness with the 2.5 billion euros budget, in the period 2014 to 2020. COSME represents a financial instrument

that promote the access to finance and encourage the entrepreneurial culture and the creation of new companies, continuing to develop the activities began in the Competitiveness and Innovation Programme 2007-2013, [2].

To enroll in a sustainable development SMEs must faced many obstacles: poor information on environmental impacts and risks, lack of knowledge regarding the potential benefits of environmental management and eco-innovation, insufficient access to information or appropriate training, [3].

In order to support SMEs targeting toward eco-friendly management and technologies it was developed industrial management research concerning the achievement of an eco-innovation library, part of an eco-innovation hub. Its purpose is to be an useful business tool, allowing users access to relevant information resources in the field of recycling and eco-innovation.

2. Objectives. Elaborating the eco-innovation library system structure

Elaborating the eco-innovation library belongs to the national project EcoInnEWaste: "Virtual hub for eco-innovation to increase competitiveness in the field of electrical and electronic equipment waste recycling". Its objectives respond to multiple challenges, having profound economic, social and environmental implications: increasing organizational competitiveness of Romanian firms operating in the electrical and electronic equipment waste recycling (e-waste, WEEE) and increasing of public and private entities involvement in promoting eco-innovation and development of green economy, [8].

A large number of challenges related to e-waste recycling are facing to business environment and authorities, aiming to

eliminate hazardous components and recovering a bigger recyclable materials quantity, in safe condition for humans and environment.

Romanian SMEs often face barriers in their e-waste recycling business development and especially in eco-innovative technologies implementation. It is important to encourage eco innovation and the innovators needs must be visible, also finding support at authorities level, research and business environment.

The virtual hub and the eco-innovation library represent a clear infrastructure to collect and analyze data, easily accessible for general public and key-actors, where internet facilities play an important role.

Elaborating the eco-innovation library structure has as main objective the achievement of good documentation, enabling users who access the EcoInnEWaste platform for current information about eco - innovation, at national and international level. This instrument is addressed to business representatives and companies that are involved or they want to get involved in the eco innovation and waste of electric and electronic equipment (WEEE) issues, [8].

To establish the eco innovative library system structure it was necessary to analyze and specify: the offer of request information, the networking opportunities between library components, the access to collect legislation information, the access to novelties in eco innovation domain, the opportunity to participate in events in the field, gathering practical information on collecting, transport to waste landfills, treatment and / or recycling.

The purpose of the library is to obtain fast practical or theoretical information for the user. Building eco-innovation library has many directions: specifying library components, establishing its functionalities, interfaces design and implementation of design specifications.

The result must be an accessible, easy to use library, providing actual and useful information.

To establish the library functionalities there were considered some special issues to ensure the information delivery to the user:

- the ability to manage (add, delete, change) the information and selection criteria by administrators;
- the possibility of searching term customization by users;
- the possibility of specialized documentation regarding WEEE legislation for users;
- the possibility of specialized documentation for users regarding business environment involved in WEEE issues;
- the possibility of specialized documentation for users regarding WEEE studies, researches, guides;
- the possibility of specialized documentation for users regarding eco-innovation technologies;
- the possibility of specialized documentation for users regarding WEEE and eco - innovation novelties.

Eco-innovation library access must be easy and fast and information obtaining must satisfy the user by their topicality and their multitude of interest areas.

3. Elaborating the eco-innovation Library Modules

The eco-innovation Library (figure 2) is structured in modules, targeting the main directions of interest for business environment and researchers in the field:

- Environmental legislation;
- The actors involved in e-waste management;
- Studies, research, guides, works in the WEEE and eco - innovation fields;
- Eco- innovation technologies;
- Novelties in WEEE and eco innovation fields.

After establishing eco-innovation components library there are designed interfaces, in order to interconnect them in a user-friendly tool with accurate design specifications. The methodology consists in following iterative steps; first, it is selected the domain/field, then the sub-domain to be examined to find information directly (which may be a link, a page of text or pdf file).

All information are stored in particular, special folders for each module, in a big folder named "Library documents", which is attached to the Library.

The module concerning environmental legislation presents the main action directions at national and international levels, in environmental legislation, especially for waste of electrical and electronic equipment (figure 3).

The information can be obtained from three directions: national level, European Union level and other non - EU countries. By selecting one of these sub-domains and using a key-word in Romanian or English language there can be obtained the desired information.

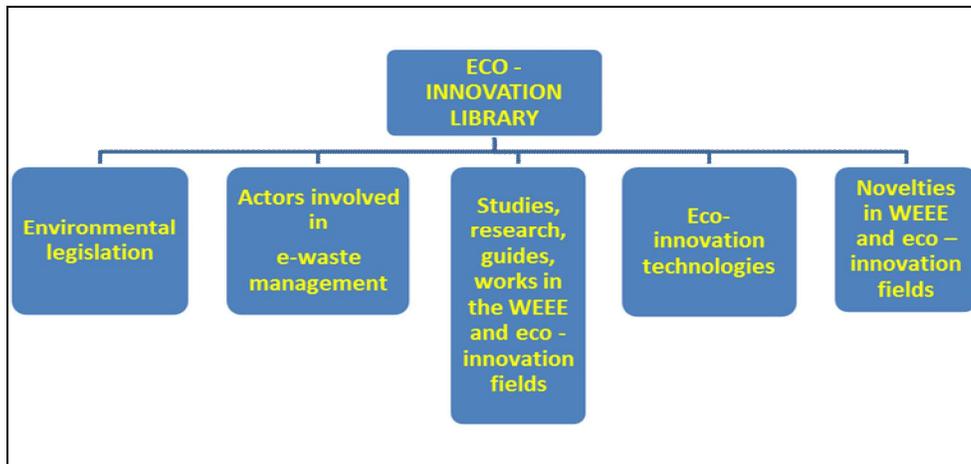


Fig. 2. *The structure of the eco-innovation library*

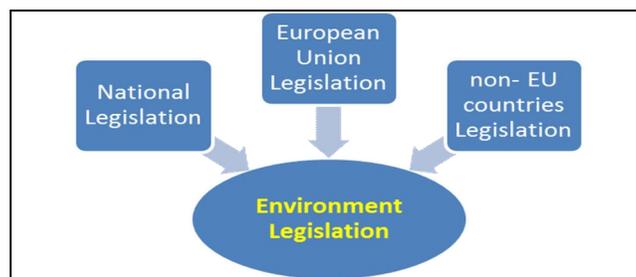


Fig. 3. *The structure of the Environmental Legislation module of the eco-innovation library*

The module concerning the actors involved in e-waste management (Figure 4) aim to find information about:

- Business environment involved in WEEE domain;
- Organizations and NGOs active in the field,
- Authorities and relevant information from domain.

The user can find information by direct access to links or PDF files; it is a good opportunity to find possible cooperation, making information exchange or finding new information about the authorities involved in WEEE.

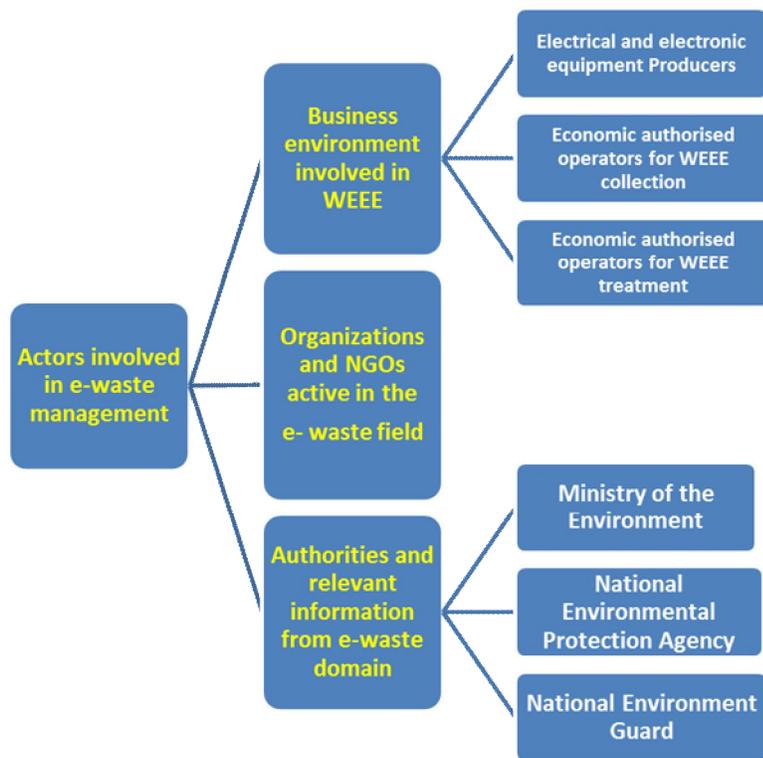


Fig. 4. The structure of the “Actors involved in e-waste management” module of the eco – innovation library

The module about ōStudies, research, guides, works in the WEEE and eco - innovation fieldsō is referring to theses, dissertations, books, guides, reports, studies and papers published in professional journals and conferences volumes, which are organized in WEEE field. The project team has done a

documentary research concerning focus area with latest and most relevant information on electrical and electronic equipment waste, also about related areas concerning analyzes, processes, technologies from waste recycling field. Systematization of found information was made based on importance criteria,

practical utility and contribution of scientific knowledge.

The sub-module concerning PhD. Thesis offers information about author, thesis name, sustaining year, number of pages and thesis. The list of theses related to the domain can be enriched in next years, it represents the beginning of a continuous study and research activities.

The sub-module concerning books in the e-waste field offers information about the name of the book, authors, the release year, publisher and ISBN. The book can be found at one of the specialized libraries or user may request detailed information on the Forum Hub.

If it is selected the sub-module about Guides, reports and specialized studies - the user may request information from the field by searching for keywords in Romanian or English language.

If it is selected the sub-module about Published articles in specialized journals and in Conferences volumes on WEEE field - the user may consult and seek information from websites, he can ask about existing articles from databases or he can find indications to read articles that can be consulted on request.

The information include the names of conferences volumes and the international scientific events on the WEEE domain, with the links to be found.

The last module is focused on Novelties in WEEE and eco innovation fields and it gathers information about seminars, conferences and meetings on WEEE and related topics, about publications and opportunities to promote stakeholders activities in this area.

This database is evolving, information will be continuously enriched with new ones, carrying out the project.

The eco-innovation technologies module consists in elaboration of the implementation model for eco-innovation

technologies, at firm level and identifying success stories and possible ways toward successful methodologies, leading to the company's development.

The implementation model for eco-innovation technologies focused on analyzing Romanian market, being closer and more accessible to our companies. The project will enrich the platform database with international success.

By consulting the Bucharest Chamber of Commerce and Industry database and information available on eco-innovative companies websites there were selected information from 51 companies with eco-innovative technologies. By analysing their activities and business opportunities there were found common denominator factors from the variety of eco-innovative technologies, in order to develop the implementation model for eco-innovation technologies, at firm level.

Conclusions

The EU's 7th Environment Action Programme (7EAP) set out a vision of living well within the limits of the planet, including the need to turn the Union into a resource-efficient, green, and competitive low-carbon economy, by 2050. These proposed objectives will require the adoption of new eco-innovative technologies by the business environment, while these innovative ideas will in turn make European companies more competitive and help drive their growth, [1].

The expected results of the EcoInnEWaste project and the achievement of the eco-innovation library converge to facilitate the know-how transfer in the field of eco-innovation, in order to improve WEEE recycling and to promote eco-innovation.

The innovative Hub will mediate the exchange of best practices between the private and public sectors, concerning the

WEEE recycling possibilities and the exchange of experiences and expertise between different private actors involved in eco-innovation and WEEE management.

It will provide the premises for virtual interaction, being accessible to all interested stakeholders, universities, business environment actors and policy makers involved in WEEE recycling, [8].

The eco-innovation hub usage will give opportunities for training / instruction by universities, consulting firms and private stakeholders, contributing to the development of professional skills in WEEE and convergent areas and increasing the number of existing national specialists in this domain.

The industrial management research concerning the achievement of an eco-innovation library propose an actual database of studies, reports, books, theses and dissertations, eco-innovative technologies and information in WEEE domain. The library represents a good opportunity for the dissemination of best practices in e-waste recycling, being also an instrument to popularize research results, experiences and relevant articles of specialists activities in the field.

The EcoInnEwaste hub and its instrument of the eco-innovation library of promote meetings, seminars, scientific congresses, conferences and other events in WEEE recycling domain. So, it is created the chance to increase the visibility of Romanian research, to connect different actors in WEEE field and to achieve international cooperation and transfer of knowledge and expertise between WEEE recyclers, manufacturers and importers, business environment, universities and policy makers.

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